Earth Science

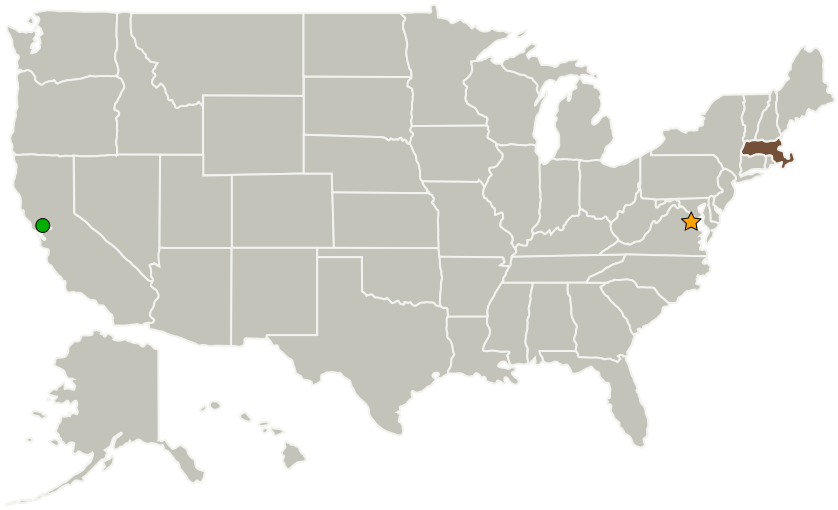
Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting

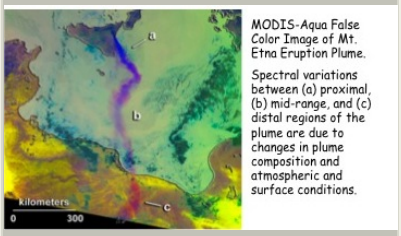
Completed Technology Project (2012 - 2015)

Project Introduction

Real-time quantification of volcanic gaseous and particulate releases from analysis of satellite-based Thermal Infrared (TIR) spectral imagery data
Real-time visualization of the impact of changes in model parameters on the fit between observed and model radiance spectra.
Graphical Processing Unit (GPU) implementation of MODTRAN's TIR radiance algorithms integrated into an interactive toolkit for retrieving and mapping the 3-D composition of atmospheric plumes using JPL established retrieval algorithms.
Achieve 100 fold run-time reduction of radiative transfer calculations vs. state-of-the-art MAP_SO2 model.

Primary U.S. Work Locations and Key Partners





Project Image Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting

Table of Contents

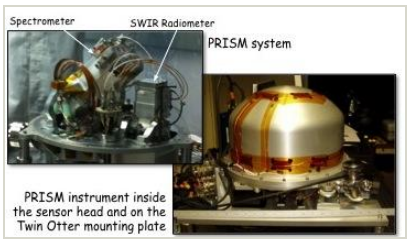
Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting

Completed Technology Project (2012 - 2015)

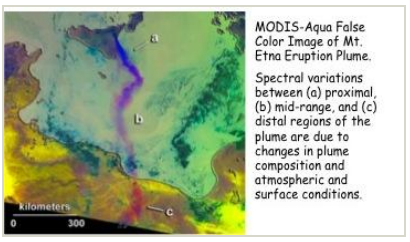
Organizations Performing Work	Role	Type	Location
★NASA Headquarters(HQ)	Lead Organization	NASA Center	Washington, District of Columbia
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Spectral Sciences, Inc.	Supporting Organization	Industry	Burlington, Massachusetts

Primary U.S. Work Locations
Massachusetts

Images



11903-1362065481319.jpg
Project Image Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting
(https://techport.nasa.gov/image/1662)



11903-1362065736400.jpg
Project Image Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting
(https://techport.nasa.gov/image/1664)

Organizational Responsibility

Responsible Mission Directorate:
Science Mission Directorate (SMD)

Lead Center / Facility:
NASA Headquarters (HQ)

Responsible Program:
Earth Science

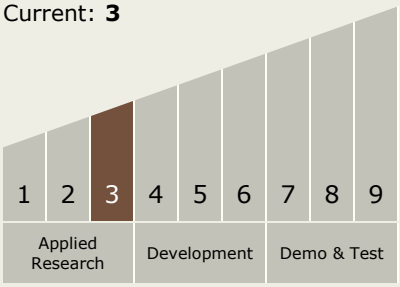
Project Management

Program Director:
George J Komar

Principal Investigator:
Alexander Berk

Technology Maturity (TRL)

Start: **3**
Current: **3**



Technology Areas

Primary:

Continued on following page.

Plume Tracer: Interactive Mapping of Atmospheric Plumes via GPU-based Volumetric Ray Casting

Completed Technology Project (2012 - 2015)

Technology Areas *(cont.)*

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.7 Learning and Adapting

Target Destination

Earth